



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/954,486	09/17/2001	Charles Edwin Thorn	10059US09	7399

7590 12/18/2002
McAndrews Held & Malloy, Ltd.
34th Floor
500 West Madison Street
Chicago, IL 60661

EXAMINER

PATEL, ISHWARBHAI B

ART UNIT	PAPER NUMBER
----------	--------------

2827

DATE MAILED: 12/18/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/954,486

Applicant(s)

THORN ET AL.

Examiner

Ishwar (I. B.) Patel

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 1 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 2-22 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
 - I. Claim 1, drawn to a method of applying an electrical conductive coating to a non-conductive surface, classified in class 427, subclass 122.
 - II. Claims 2-22, drawn to a printed wiring board, classified in class 174, subclass 257.

The inventions are distinct, each from the other because of the following reasons:

2. Inventions II and I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially different process such as fixing step, step D, is not required in the product. Further, the step of contacting the nonconductive surface with a conditioning agent is not required in the product.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with George Wheeler (Reg. 28,766) on December 2, 2002, a provisional election was made with traverse to prosecute the invention of a printed wiring board, claims 2-22. Affirmation of this election must be made by applicant in replying to this Office action. Claim 1 withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

5. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

6. The subject matter of this application admits of illustration by a drawing to facilitate understanding of the invention. Applicant is required to furnish a drawing under 37 CFR 1.81. No new matter may be introduced in the required drawing.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minten et al., US Patent 4,684,560, hereafter Minten.

Regarding claim 2, Minten discloses a printed wiring board comprising:

at least two conductive circuit layers separated by nonconductive material; at least one recess in said nonconductive material defined by a non conductive surface intersecting at least two of said conductive circuit layer (printed circuit board with a non conductive through hole, column 4, line 50 to column 5, line 10, column 13, line 25-35);

an electrically conductive coating on said nonconductive surface, said coating including electrically conductive carbon and a water dispersible organic binding agent, wherein said coating is electrically conductive, allowing electrical current to flow between the two conductive circuit layers, and accepts electroplating to provide a surface at least substantially free of visible void (carbon coating with a liquid dispersion medium, column 7, line 5-65,), except

explicitly disclosing the carbon having a mean particle size not greater than about 1 micron. Though Minten discloses the carbon particle with an average particle diameter below about 3 microns, further discloses a preferred range from 0.1 micron to about 2

micron, and discloses better results achieved by smaller carbon particle size, column 7, line 5-20. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the circuit board of Minten with the mean carbon particle size not greater than about 1 micron in order to have better plating.

Regarding claims 3-11, the applicant is claiming various resistivities between the said conductive circuit layers before electroplating. Though Minten does not disclose the resistivity between the conductive circuits, the crux of the invention of Minten is to provide a carbon coating to have even plating with desired plating characteristic for better electric connection between two conductive layer separated by a non conductive layer. Further, the applicant is not disclosing any specific advantage / disadvantage with various resistivity. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Minten with the resistivity between the circuit layers before electroplating as claimed in order to have resultant better electrical connection between the two conductive circuits.

Regarding claim 12, the circuit board on Minten further includes multiple holes for electrical connection between various circuit layers (column 13, line 25-35).

Regarding claim 13-16, the applicant is claiming various thickness of the coating in the recess. Though Minten does not disclose the thickness of the coating layer, the thickness will depend upon the diameter of the carbon particles used and the thickness

will be selected to have uniform coating to have resultant even plating. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Minten with the thickness of the coating as claimed in claims 13-16 in order to have uniform coating to have resultant even plating based on the diameter of the carbon particle used.

Regarding claim 17, Minten further discloses coating free of lumpiness (particle diameter and percentage adjusted to get uniform coating, column 9, line 5-60).

Regarding claims 18 and 19, the applicant is claiming water dispersible organic binding agent selected from group consisting of monosaccharides and polysaccharides as claimed in claims 18 and the carbon comprise graphite as claimed in claim 19. Though, Minten does not disclose such specific materials, both materials are known in the art and can be used depending upon the specific manufacturing conditions to have desired coating of the carbon for better and reliable electroplating. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Minten with materials as claimed, apparently in order to have even coating for better and reliable electroplating. Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

Regarding claim 20, the modified circuit board of Minten discloses all the feature of the claimed invention including the a recess intersecting at lest two conductive circuit layer with a graphite coating as applied to claims 1-19 above.

Regarding claim 21, the modified circuit board of Minten further discloses electroplating on electrically conductive coating in the recess.

Regarding claim 22, though the modified circuit board of Minten does not disclose solder deposition on the electroplated portion, such coating is known in the art for protecting the surface of circuits and holes during storage. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the modified circuit board of Minten with solder deposition in the electroplated recess in order to protect the surface during storage.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Florio et al., US Patent 5,738,776 and 5,858,198 discloses coating of carboneous particles using carbon black or graphite particles in the holes.

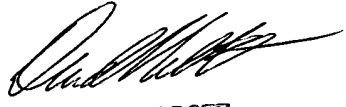
Gupta et al., US Patent 4,718,993 discloses an improved process for through hole plating of a printed circuit board with dispersion of carbon black.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (703) 305 2617. The examiner can normally be reached on M-F (6:30 - 4) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David L Talbott can be reached on (703) 305 9883. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305 3431 for regular communications and (703) 305 7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308 0956.

ibp
December 15, 2002



DAVID L. TALBOTT
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800